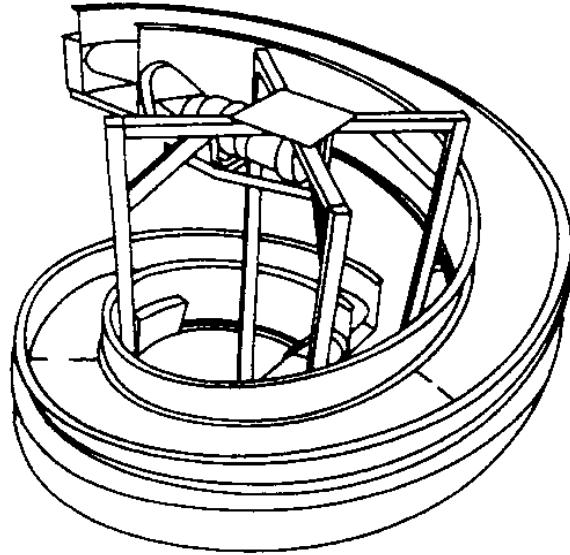


OWNER'S MANUAL



SPIRAL-LIFT[®] **SPIRAL BELT CONVEYORS**

Conveyor Location: _____
Model Number: _____
Serial Number: _____



PORTEC, INC.
P.O. BOX 589
CAÑON CITY, COLORADO 81215-0589 USA
Telephone: +1(719) 275-7471
Fax: +1(719) 269-3750
Email: sales@portec.com
Web: www.portec.com

Table of Contents

I.	Safety precautions	3
II.	Service and maintenance	5
	A. Visual inspection	5
	B. Fasteners	5
	C. Chain & sprockets	5
	1. Chain tension	5
	2. Connecting links	8
	3. Attachment links	8
	4. Sprocket alignment	10
	5. Sprocket set screws and taper lock hubs	10
	6. Lubrication	11
	D. Chain guides	13
	E. End rolls	14
	1. Alignment	15
	F. Conveyor belt	15
	1. Adjustment	15
	2. Replacement	16
	a. Laced on both ends	16
	b. Laced on one end	17
	c. Single segment	20
	G. Return rolls	22
	1. Inspection	22
	2. Replacement	22
	3. Conversion from tapered return rolls	22
	H. Drive unit	24
	1. Gear reducer	24
	I. Troubleshooting guide	25
	J. Preventive maintenance schedule	27
III.	Spare parts	28
	A. Recommended spare parts	28
	B. Spare parts list	29
	C. Illustrated parts diagram	31
IV.	Terms & Conditions	32

I. Safety precautions

Portec Flomaster does not install conveyors, therefore, it is the responsibility of the contractor, installer, owner and user to install, maintain and operate the conveyor, components and conveyor assemblies in such a manner as to comply with all national, state and local laws and ordinances, including the Occupational Safety and Health Act, and the American National Standards Institute (ANSI) B20.1 Safety Code and Z244 Lockout/Tagout.

In order to avoid an unsafe or hazardous condition, the conveyors or parts must be installed and operated in accordance with the following minimum provisions.

1. Conveyors shall not be operated unless all covers and/or guards for the conveyor and drive unit are in place. If the conveyor is to be opened for inspection cleaning, maintenance or observation, the electric power to the motor driving the conveyor must be LOCKED OUT/TAGGED OUT in such a manner that the conveyor cannot be restarted by anyone; however remote from the area, until conveyor cover or guards and drive guards have been properly replaced.
2. If the conveyor must have an open housing as a condition of its use and application, the entire conveyor is then to be guarded by a railing or fence in accordance with the current revision ANSI standard B20.1.
3. Do not attempt any maintenance or repairs of the conveyor until power has been LOCKED OUT/TAGGED OUT.
4. Always operate conveyor in accordance with these instructions and those contained on the caution labels affixed to the equipment.
5. Do not place hands, feet, or any part of your body, in the conveyor.
6. Never walk on conveyor covers or guards. Never climb, sit, stand, or work from a conveyor.
7. Do not use conveyor for any purpose other than that for which it was intended.
8. Do not poke or prod material into the conveyor with a bar or stick inserted through the openings.
9. Keep the area around conveyor drive and control station free of debris and obstacles.
10. Eliminate all sources of stored energy (materials or devices that could cause conveyor components to move without power applied) before opening the conveyor
11. Do not attempt to clear a jammed conveyor until power has been LOCKED OUT/TAGGED OUT.
12. Do not attempt field modification of conveyor or components without prior approval of Portec Flomaster.
13. Conveyors are not normally manufactured or designed to handle materials that are hazardous to personnel. These hazardous materials include those that are explosive, flammable, toxic or otherwise dangerous to personnel. Conveyors may be designed to handle these materials. If hazardous materials are to be conveyed, Portec Flomaster should be consulted prior to any modifications.
14. When two or more conveyors are interfaced or joined together, make sure there is adequate guarding, pinch point protection and safety devices.
15. Only trained operators should be permitted to operate and maintain conveyors. Training needs to include instruction in operation under normal conditions and emergency conditions.
16. All starting and stopping devices should be clearly marked and the immediate area kept clear of obstructions to permit ready access.
17. The areas around loading and unloading points should be kept clear of any obstructions.
18. A person should NOT BE PERMITTED TO RIDE on any conveyor not specifically designed and approved to convey people.

19. Workers working around or operating conveyors should be shown the location of the starting and stopping devices and instructed how to use them to stop the conveyor in an emergency.
20. Do not use a conveyor for any purpose other than that for which it was intended. A conveyor should only be used to transport material it is capable of handling safely.
21. Under no circumstances should safety guarding or labels attached to the conveyor be altered or removed without written permission from the owner/manufacturer. If the labels attached to the equipment become illegible, order replacement warning labels from Portec Flomaster or Conveyor Equipment Manufacturer's Association (CEMA) at www.cemanet.org.
22. Routine inspections and Preventive and Corrective maintenance programs should be conducted to ensure that all safety features and devices are in place and functioning properly.
23. Employees should be alerted to the potential hazard of entanglement in conveyors caused by items such as long hair, loose clothing, and jewelry.
24. As a general rule, conveyors should not be cleaned while in operation. Where proper cleaning requires the conveyor to be in motion and a hazard exists, personnel should be made aware of all associated hazards as indicted above and take proper precautions.

Additional Safety Notes:

Disconnecting and locking out the power to the motor driving the unit provides the only real protection against injury. Secondary safety devices are available; however, the decision as to their need and the type required must be made by the owner-assembler as Portec Flomaster has no information regarding plant wiring, plant environment, the interlocking of the conveyor with other equipment, extent of plant automation, etc. Other devices should not be used as a substitute for locking out the power prior to removing guards or covers. We caution that use of the secondary devices may cause employees to develop a false sense of security and fail to lock out power before removing covers or guards. This could result in a serious injury should the secondary device fail or malfunction.

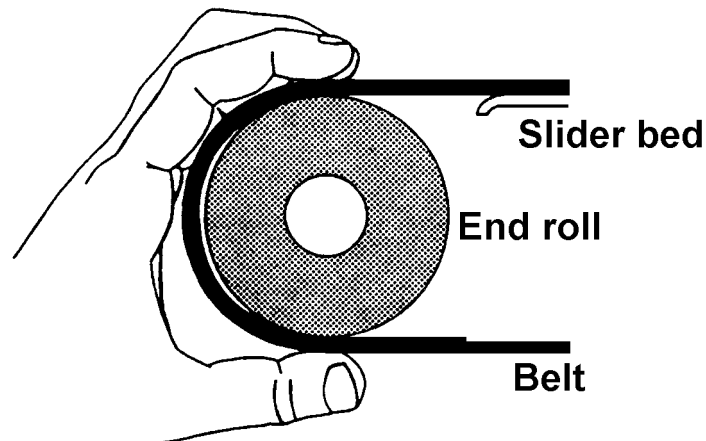
Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary ingredients for a safe working place. It is the responsibility of the contractor, installer, owner and user to supplement the materials and services provided by Portec Flomaster to make the conveyor installation comply with the law and accepted standards.

Examples of Safety Labels used on conveyors:



II. Service and maintenance

A. Visual check: Check for any changes, rub marks, abrasion, noises, excessive dust, or damage to the belt. The belt must be relatively clean and gouge free. The belt seams should be in good condition with no evidence of damage or excessive wear. The chain should be adjusted so it is snug, not tight. The belt should never be tight against the end roll or damage to the conveyor may result.



**Squeeze and pull --- 1/16" to 1/8" gap
1.6 - 3.2 mm
(AT THE INSIDE RADIUS END OF THE END ROLL)**

1. Turn on the conveyor and visually check that the chain that is attached to the belt makes a smooth transition from the chain guides to the sprocket. Listen for chain chatter and watch for uneven chain movement. Make adjustments as necessary.
2. Check that all guards and safety devices are in place.

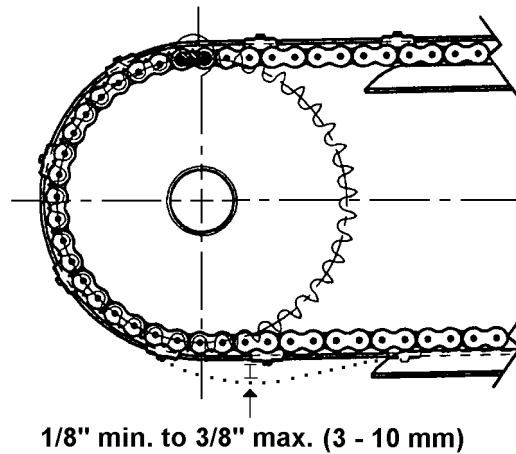
B. Fasteners: Inspect all fasteners to be sure they are tight.

C. Chain & sprockets

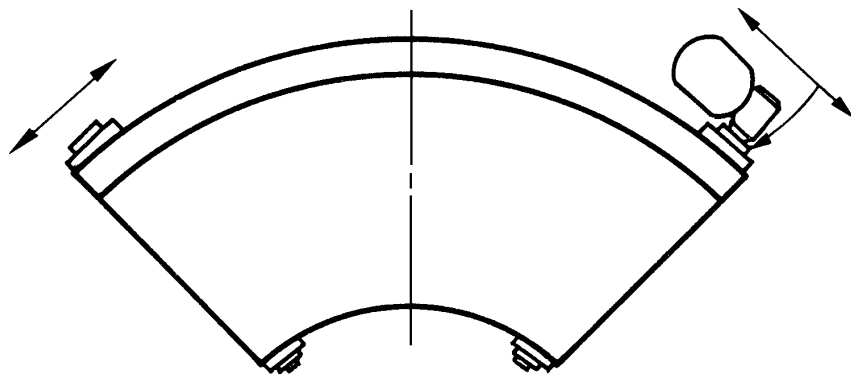
1. **Chain tension:** Excessive chain rattling or rumbling as the chain engages the sprockets is an indication that the chain is incorrectly tensioned. Chain "looseness" will possibly develop in a new Portec Spiral-Lift during the "run-in" period due to the "seating" of the chain in the chain guide material and normal elongation of the chain. Chain elongation most often appears after extended operation. Chain tension may be adjusted as follows:

- a) Remove the chain cover to reveal the chain and sprocket. Be careful not to bend or distort the chain cover when removing.

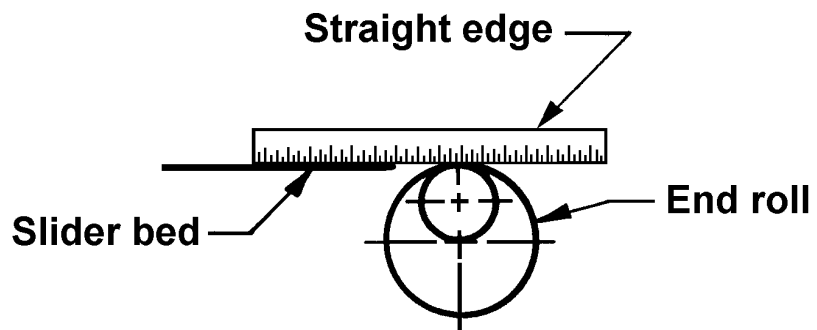
guide. While running, the chain sag (slack) should be no less than 1/8" (3 mm) or more than 3/8" (10 mm).



Chain Adjustment

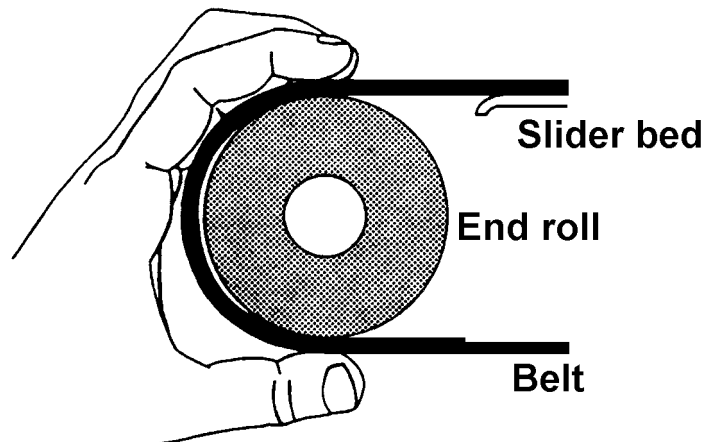


d) Before final tightening of the bearing bolts, check the alignment of the end roll with the slider bed.



e) Check the belt tension at the inside radius end of the end roll to insure that the belt is not snug against the end roll. Squeeze the

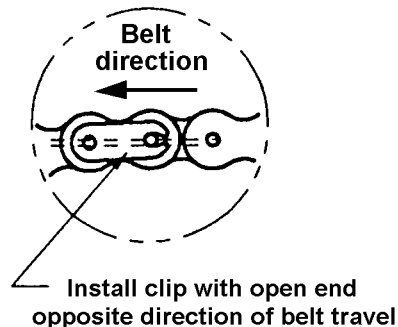
belt on the end roll and pull slightly. There should be a gap of 1/16"-1/8" (1.6-3.2mm) between the belt and the end roll.



**Squeeze and pull --- 1/16" to 1/8" gap
1.6 - 3.2 mm
(AT THE INSIDE RADIUS END OF THE END ROLL)**

f) Replace chain cover.

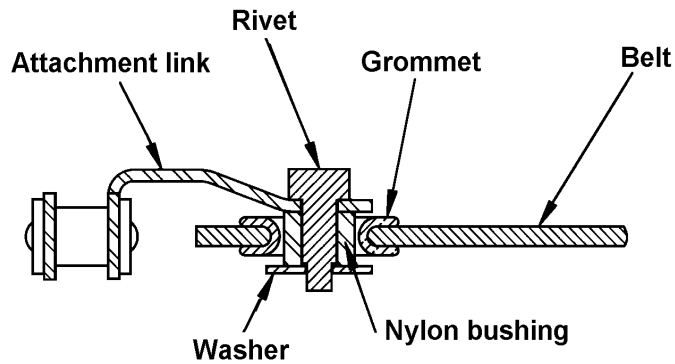
2. **Chain connecting link:** The chain connecting link on a Portec Spiral-Lift was designed to be used with sidebow chain. The chain is allowed to flex in order to bend around the curve. Do not use a connecting link that is designed for use only with straight roller chain. When installing the connecting link, insure that the open end of the clip is opposite the direction of belt travel.



3. **Attachment links:** Attachment link is used to attach the sidebow chain to the outside edge of the curved belt. If the attachment link is damaged, it may be replaced as follows:

a) Remove the chain cover.

b) Move belt assembly until the damaged attachment link is on the top the conveyor.



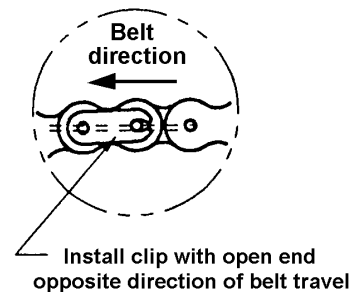
Cross section of belt w/hardware

c) Loosen the belt tension by loosening the outside radius end roll bearing bolts on the non-drive end.

d) Lift up the drive chain out of the chain guide track and break the chain on each side of the damaged attachment link.

e) Bend the edge of the belt over and grind off the rivet that holds the attachment link to the belt and remove the damaged attachment link. **Be careful not to contaminate the grease in the chain guide track with metal particles.**

f) Install a new attachment link into the chain using two connecting links. Insure that the connecting link clip is in the proper direction in relation to the belt direction.



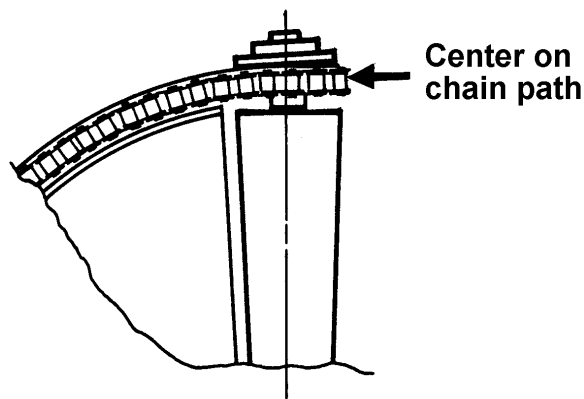
g) Inspect the condition of the grommet in the belt. Replace if it is worn or damaged.

h) Connect the new attachment link to the belt using a new rivet, washer and nylon bushing. Place a heavy piece of metal under the rivet when peening the washer unto the bottom of the rivet. The rivet end should be peened enough to securely attach the washer while allowing the washer to rotate on the bottom of the rivet.

Care should be used during the peening process to prevent damage to the belt or the top the conveyor slider bed. (Threaded rivet P/N 900800 may be used to avoid peening process.)

- i) Lay the chain back into the chain guide track.
- j) Adjust the chain tension and tighten the outside radius bearing bolts. (See Chain adjustment instructions)
- k) Replace the chain cover.

4. Sprocket alignment: The sprocket should be centered in the chain path. Sprockets that are out of alignment can cause premature wear of the chain, sprockets, and chain guides. Rattling, ticking or rumbling of the chain as it passes over a sprocket may indicate that the sprocket is out of alignment. As the chain guides wear down, the position of sprockets may have to be adjusted to accommodate the new chain path.



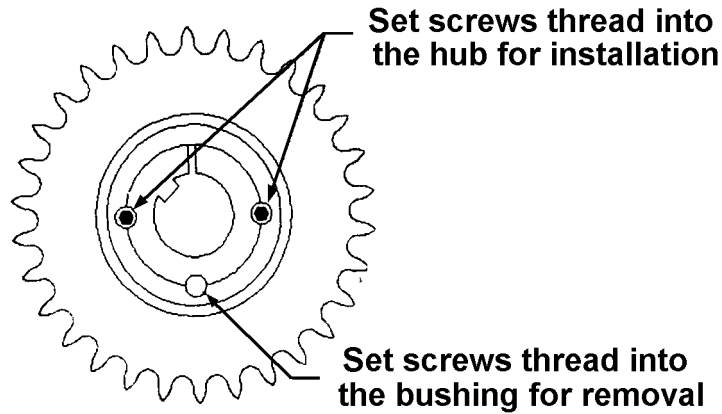
- a) When adjusting the position of the sprocket, the sprocket should be loosened on the shaft and then moved to correct position. The entire end roll assembly should be moved when the sprocket is equipped with a taper lock hub.

5. Sprocket set screws and taper lock hubs:

a) **Steel sprocket with plain bore:** A Nylock socket set screw with cupped point is used at keyway locations and a Nylock set screw with half dog point is used all other positions. It is extremely important that these different types of set screws not be interchanged in different locations because of their different locking functions.

b) Loosening taper lock hub bushings from steel sprockets:

Remove the set screws and insert them in the same hole on the back side of the sprocket. As the set screw is screwed in, it will push out the hub bushing.



c) **Tightening taper lock hubs in steel sprockets:** Insert both set screws in opposing half thread holes with the bushing hole pattern matching the hub pattern. Alternately tighten both set screws. Lightly tap the bushing to insure proper seating and retighten both set screws.

Recommended Torque Values for Installation

Bushing No.	Lb. in.	Nm
1610	175	19.9
2012	280	31.8
2517	430	48.8

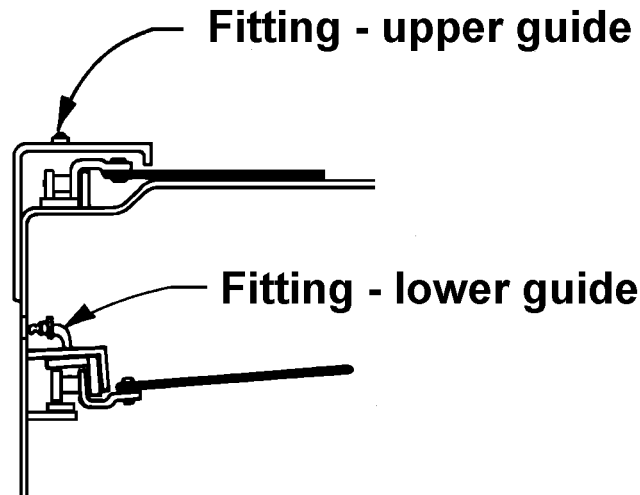
6. **Lubrication:** The upper and lower chain guides should be periodically lubricated. A mixture of dried grease and dust can greatly reduce the life of the chain and chain guides. This is especially true if the conveyor operates in dusty conditions. The conveyor is equipped with grease fittings located in the frame and chain cover along the length of the chain. We recommend using Lubriplate Molith #2 grease. The frequency of lubrication and amount required will depend upon the load, speed, and environmental conditions. Some general guidelines are as follows:

7.

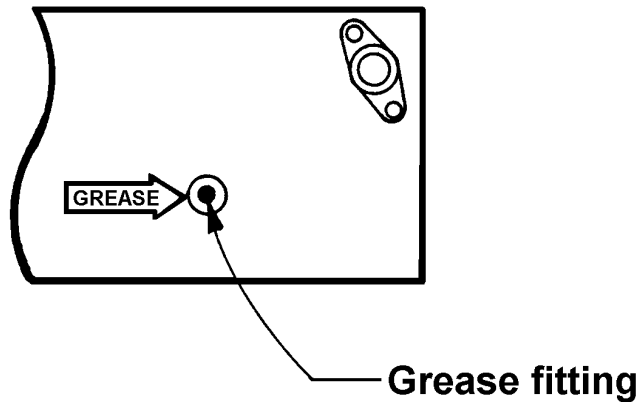
Clean conditions @ 8 hours per day	Lube every 3-4 months
Clean conditins @ 18 hours per day	Lube every 6-8 weeks
Dusty conditions @ 8 hours per day	Lube every 4-6 weeks - Clean chain every 4-6 months
High humidity	Lube enough to stop rust and every 4-5 weeks

WARNING: Running a conveyor that does not have adequate lubrication will damage the conveyor and substantially shorten the life of the chain.

a) Periodic chain cleaning with a solvent-soaked cloth is highly recommended when operating in dusty conditions. After cleaning, apply new grease to the entire length of the chain and work it well into the moving parts.



b) All Spiral-Lifts have grease fittings in the chain cover. Some models also have grease fittings in the side of the frame on the outside perimeter. The number of grease fittings on your particular turn will depend upon size and arc. Each grease fitting is clearly marked.



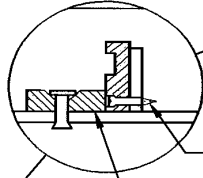
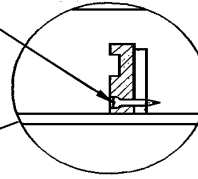
Note: If the conveyor is operating in a food application, refer to the appropriate government regulation for the correct type of food-grade grease.

D. Chain guides: The belt drive chain is held in place on the outside radius of the belt by the chain guides. When properly maintained, the chain guides will provide many years of service. If the chain guides are damaged or excessively worn, they may be replaced as follows:

1. Remove the chain cover.
2. Remove the belt and chain assembly.
3. Remove the old chain guides and fasteners. Take note of the positions and shapes of the old chain guides. **Note:** Some older Spiral-Lifts had a chain guide strip mounted in the chain cover. Because this chain guide strip does not contact the chain, it does not need to be replaced.
4. Follow Chain Guide Installation steps on following page.
5. Reinstall the belt and chain assembly.
6. Lubricate the chain and reset the chain tension.
7. Check the position of sprockets to insure that they are in the center of the chain path.
8. Replace the chain cover.

CHAIN GUIDE INSTALLATION

STEP 1: Clamp chain guide material in position and drill through with 5/64" (2 mm) bit. Drive and set the #4d finish nails.



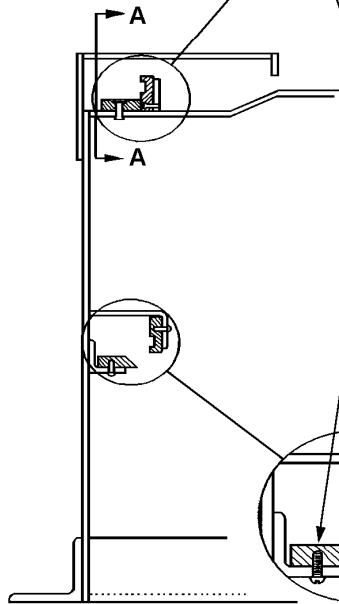
STEP 3: Trim the nail points.

STEP 2: Position the horizontal chain guide tight against the vertical guide, countersink and drill 1/8" (3.2 mm) holes through as required for tight fit. Attach with 1/8" pop rivets.

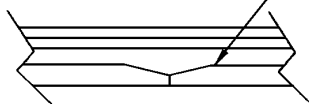
NOTE: The upper vertical chain guide at the chain approach and exit ends (not shown) require a 6-32 x 1/2" FH slotted type "F" counter sunk screw, use a 7/64" (2.75 mm) drill.

STEP 4: Position the beveled horizontal guide and drill 3/32" (2.35 mm) pilot holes matching the existing 5/32" (4 mm) clearance holes in the metal guide supports. Attach with self-tapping screws.

STEP 5: Position the vertical guide material as shown and drill 3/32" (2.35 mm) pilot holes matching the existing 5/32" (4 mm) clearance in the metal guide supports. Attach with self-tapping screws.



To keep the chain from lifting the chain guides, bevel the chain guide splices & attach the guides near the edges, stagger horizontal & vertical splices.



VIEW -A-

NOTE: Match drill new chain guides to the old mat'l. when possible to save drilling extra holes through chain guides and the conveyor bed.

E. End rolls: A tapered end roll is used to accommodate the difference in belt speeds from the inside radius to the outside radius of the conveyor. End roll lagging is not required because the conveyor belt is powered by the outside perimeter chain and not by the end roll. When properly aligned and fastened to the drive shaft, it is rare for the end roll to need replacement. Replacement is required when the end roll has been damaged due to hub keyway failure,

repeated contact with caustic or corrosive chemicals, or long term exposure to wet environments.

1. **Alignment:** The end roll alignment can be adjusted as follows:

- a) Remove the chain cover
- b) Measure the distance from the end of the end roll at the top edge to the inside edge of the upper chain guide support. It should be 1-3/4" (45 mm).
- c) Move the belt assembly around until the laced belt seam and chain connecting link are on the top side of the conveyor near the end roll that needs to be adjusted.
- d) Remove the chain connecting link and pull out the belt lacing pin. Lay the end of the belt back to expose the end roll.
- e) Loosen the set screws that secure the end roll to the drive shaft.

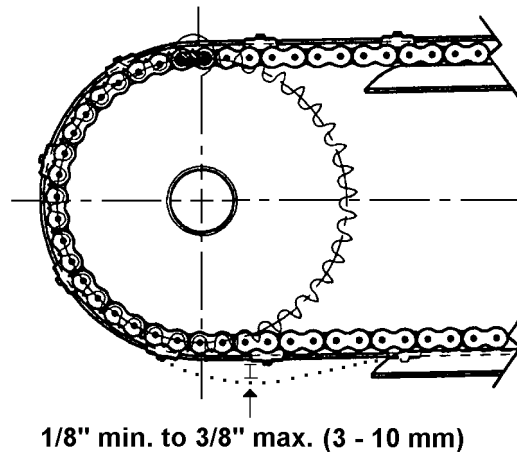
Note: If the end roll has a taper lock hub, it may require a long handled Allen wrench that has been bent slightly to clear the end of the end roll. Remove the set screws from the taper lock bushing
- f) Adjust the position of the end roll on the shaft and retighten the set screws.
- g) Reattach the belt ends and chain connecting link.
- h) Replace the chain cover.

F. **Conveyor belt:** The conveyor belt on a Portec Spiral-Lift is powered by a chain that is attached to its outside edge. The chain powered belt does not rely on friction between the end roll and the bottom of the belt, so the end roll should not be tight against the belt. The belt and chain assembly has a positive direct drive system that is not effected by loading or environmental conditions. While the system is rugged and reliable, a few adjustments will keep the conveyor operating well for many years.

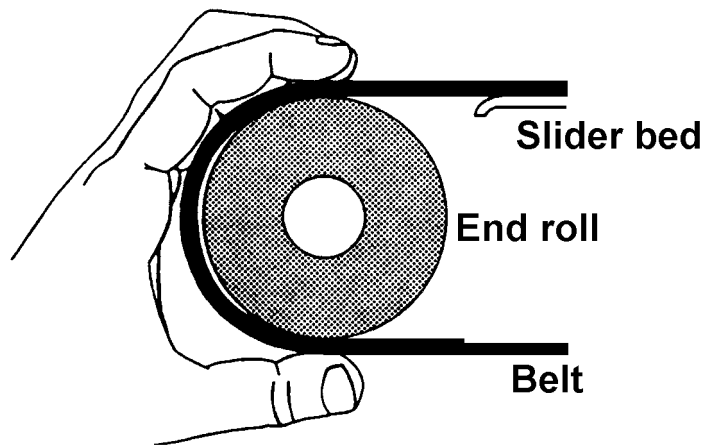
1. **Belt adjustment:** The belt tension on the outside radius is set by adjusting the chain tension.

- a) Adjust chain tension by moving outside radius bearing assembly until the chain, as it leaves the discharge end sprocket, has a slight sag as it enters the entry end lower chain guide. While running, the

chain sag (slack) should be no less than 1/8" (3 mm) or more than 3/8" (10 mm).



b) Adjust the inside radius end of the end roll until there is a 1/16-1/8" (1.5-3.0 mm) gap between the end roll and the belt when the end roll is squeezed and pulled slightly.



**Squeeze and pull --- 1/16" to 1/8" gap
1.6 - 3.2 mm
(AT THE INSIDE RADIUS END OF THE END ROLL)**

Note: Over-tensioning may damage the belt and attachment components.

2. Belt replacement:

a) **Belt replacement (laced seams on both ends):** If the belt becomes worn or damaged, it may be replaced as follows:

- (1) Remove the chain cover.
- (2) Loosen all end roll bearing mounting bolts and slide the end roll assemblies to their minimum adjustment positions.

(3) Move the belt assembly until the chain connecting link is on top side of the conveyor.

(4) Remove the chain connecting link and the seam lacing pin next to the end of the chain.

(5) Place the new belt assembly on the conveyor and attach one end of the new belt to the end of the old belt by installing a connecting link and lacing pin. As the old belt is pulled off the conveyor, the new belt will be pulled over the end roll and underneath the conveyor. As the end of the new belt is pulled around the second end roll, it may be disconnected from the old belt.

(6) Pull both ends of the chain together in the chain wear guides and attach the special connecting link. **Note:** Sidebow connecting links must be used joining the chain ends. Standard roller chain links will not fit properly and will tend to work loose or stiffen the chain.

Note: The connecting link clip must be placed on the outer side of the chain with the open end facing away from the direction of travel.

(7) Adjust the chain tension by moving both end roll assemblies until the chain sag is 1/8"-3/8" (3 - 10 mm). The inside radius end of the end rolls should remain loose.

(8) Lay both belt ends together, align the outside edges and install the lacing pin. Bend the lacing pin over on the outside radius and insert the end of the lacing pin into the lacing hooks. Ensure that about 1/2" (13 mm) of lacing pin is inserted into the hooks. Pull the lacing pin taut on the inside radius, bend the lacing pin back and insert the end of the lacing pin into the lacing hooks. The lacing pin may have to be cut to length.

(9) Adjust the belt tension on the inside radius.

(10) Replace the chain cover.

b) **Belt replacement (laced seams on one end only):** If the belt becomes worn or damaged, it may be replaced as follows:

(1) Remove the chain cover.

(2) Disconnect the drive unit by removing the gear reducer (shaft mounted reducer) or removing the chain between the drive shaft and gear reducer (chain or belt driven units).

(3) Loosen all end roll bearing mounting bolts and slide the end roll assemblies to their minimum adjustment positions.

(4) Move the belt assembly until the chain connecting link is on top side of the conveyor.

(5) Remove the chain connecting link and the seam lacing pin next to the end of the chain.

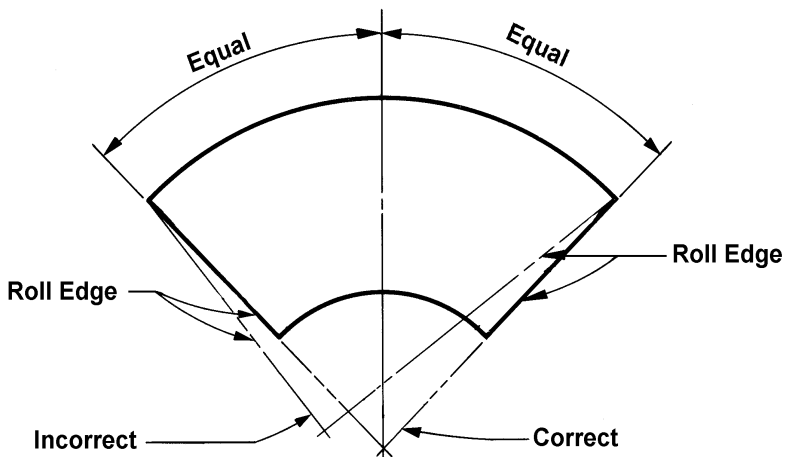
(6) Place the new belt assembly on the conveyor and attach the end of the new belt with lacing to the end of the old belt by installing a connecting link and lacing pin. As the old belt is pulled off the conveyor, the new belt will be pulled over the end roll and underneath the conveyor. As the end of the new belt is pulled around the second end roll, it may be disconnected from the old belt.

(7) Pull both ends of the chain together in the chain guides to the mid-point in the curve and attach the chain connecting link. **Note:** Sidebow connecting links must be used joining the chain ends. Standard roller chain links will not fit properly and will tend to work loose or stiffen the chain.

Note: The connecting link clip must be placed on the outer side of the chain with the open end facing away from the direction of travel.

(8) Adjust the chain tension by moving both end roll assemblies until the chain deflection is 1/32-1/16" (.8-1.6mm). The inside radius end of the end rolls should remain loose.

(9) Pull the inner radius ends of the belt together so that the ends overlap each other and the inside curvature matches along the lap. Usually, this will occur with the belt lying on the slider bed in a relaxed state.



(10) Using the laced end as a guide, draw a line on the unlaced end to be joined that is $5/16$ " (7.93mm) away from the end of the laced belt end. After the belt is cut, there should be a $5/16$ " (7.93mm) gap between the belt ends.

Note: The measurement should be from the actual end of the belt, not the end of the lacing hooks.

(11) Disconnect the chain connecting link and fold the laced end of the belt back.

(12) Using a straight edge and razor knife, cut the end of the belt along the line. **Note:** Place a piece of scrap material under the belt to prevent the slider bed from being marred.

(13) Install the belt lacing hooks in the belt end.

(14) Rejoin the chain ends by reinstalling the chain connecting link.

(15) Lay both belt ends together and install the lacing pin. Bend the lacing pin over on the outside radius and insert the end of the lacing pin into the lacing hooks. Ensure that about $1/2$ " (13 mm) of lacing pin is inserted into the hooks. Pull the lacing pin taut on the inside radius, bend the lacing pin back and insert the end of the lacing pin into the lacing hooks. The lacing pin may have to be cut to length.

(16) Adjust the belt tension on the inside radius.

(17) Connect the drive unit by installing the gear reducer (shaft mounted reducer) or reinstalling the drive chain or belt.

(18) Replace the chain cover.

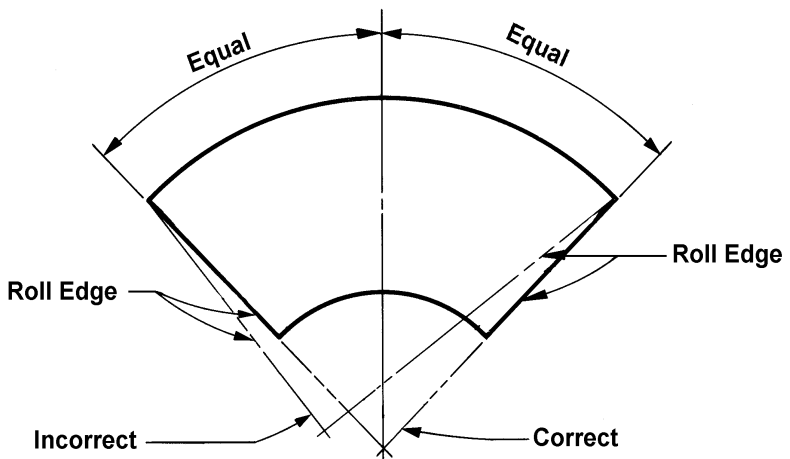
c) **Belt segment replacement (belt with laced seams):** If the belt is damaged in only one spot, it may be possible to replace only the damaged segment instead of the entire belt. Belt segments are specified by the required number of grommets. The segment has additional belt material on each end to allow the technician to cut both ends of the segment to length while it is on the conveyor. Replacement is as follows:

- (1) Remove the chain cover.
- (2) Disconnect the drive unit by removing the gear reducer (shaft mounted reducer) or removing the chain between the drive shaft and gear reducer (chain or belt driven units).
- (3) Loosen all end roll bearing mounting bolts and slide the end roll assemblies to their minimum adjustment positions.
- (4) Move the belt assembly until the damaged area is on top side of the conveyor.
- (5) Break the chain at both sides of the damaged area.
- (6) Cut and remove the damaged area of belt material. Be careful to leave additional material near the ends in order to cut to fit and install belt lacing.
- (7) Place the new belt segment on the conveyor and attach the ends of the new segment of chain to the old chain with two connecting links. The belt segment should lie flat on top of the old belt and overlap the ends of the old belt.

Note: Sidebow connecting links must be used joining the chain ends. Standard roller chain links will not fit properly and will tend to work loose or stiffen the chain. **Note:** The connecting link clip must be placed on the outer side of the chain with the open end facing away from the direction of travel.

(8) Adjust the chain tension by moving both end roll assemblies until the chain sag is 1/8"-3/8" (3 - 10 mm). The inside radius end of the end rolls should remain loose.

(9) Pull the inner radius ends of the belt together so that the ends overlap each other and the inside curvature matches along the lap. Usually, this will occur with the belt lying on the slider bed in a relaxed state.



(10) Using one end of the belt as a guide, draw a line on the other end to be joined. Then measure back $\frac{5}{16}$ " (8 mm) (to leave a $\frac{5}{16}$ " (8 mm) gap between ends) from that line and cut using a straight edge and razor knife. **Note:** Place a piece of scrap material under the belt to prevent the slider bed from being marred.

(11) Disconnect the chain at the seam to be laced.

(12) Install the belt lacing hooks in both belt ends.

(13) Rejoin the chain ends by reinstalling the chain connecting link.

(14) Lay both belt ends together and install the lacing pin. Bend the lacing pin over on the outside radius and insert the end of the lacing pin into the lacing hooks. Ensure that about $\frac{1}{2}$ " (13 mm) of lacing pin is inserted into the hooks. Pull the lacing pin taut on the inside radius, bend the lacing pin back and insert the end of the lacing pin into the lacing hooks. The lacing pin may have to be cut to length.

(15) Repeat the process to cut the second seam and install lacing.

(16) Adjust the belt tension on the inside radius.

(17) Connect the drive unit by installing the gear reducer (shaft mounted reducer) or reinstalling the drive chain or belt.

(18) Replace the chain cover.

G. Return rolls or wheels

1. **Inspection:** During periodic inspections of the conveyor, the return rollers (wheels) should be checked to insure they are in good working condition. They should roll freely without any dents, gouges, or other damage. They should be clean without any foreign matter, such as adhesive tape, stuck to the surface or wound around the shaft.

2. **Replacement:** If the return rolls (wheels) are damaged or badly worn, they may be replaced as follows:

- a) Remove the inside radius hanger bracket.
- b) Remove the return roll (wheel) shaft.
- c) Replace the roll(s) (wheels) on the shaft.
- d) Reinstall the return roll shaft and attach the inside radius hanger bracket ("D" hole in the frame side on some models).

3. **Conversion from tapered return rolls:** Some older Portec Spiral-Lifts were equipped with tapered return rolls. They may be converted to straight style return rolls or wheels as follows:

- a) Remove old tapered rolls, shafts, and inside radius hangers.
- b) Install new outside radius hangers using the shaft hole for the existing outside radius hanger.
- c) Adjust the length of the hanger to 3-3/4" (95mm) from the outside radius frame.
- d) Assemble replacement straight rolls (wheels) on the shaft.
- e) Install the shaft in the outside radius hanger and adjust the height until the return roll slightly raises the belt at the outside radius.
- f) Slide the inside radius hanger on the shaft and adjust the height until the roll (wheel) slightly raises the belt on the inside radius. The hanger bracket should have the same horizontal position as the old hanger bracket. Mark the location of the hanger bracket mounting hole and drill a 3/8" (9.5mm) diameter hole in the frame.

- g) Attach the inside radius hanger brackets with the bolts provided.
- h) The hanger brackets may be bent to adjust for the proper shaft angle.

H. Drive Unit

1. Gear reducer:

- a) **Mounting bolts** The mounting bolts should periodically be inspected to be sure that they remain tight and that no misalignment has occurred.
- b) **Lubricant** The gear reducer should be checked to insure that the lubricant level is maintained at the manufacturer's recommended level. Consult the gear reducer manufacturer or their owner's manual before adding lubricant to insure that the correct lubricant is used. Some gear reducers are permanently sealed with an internal pressure compensation device. These gear reducers normally do not need the lubricant levels to be checked.
- c) **Vent plug** Some gear reducers are shipped with a plastic plug in place of the vent plug. The plastic plug prevents oil from leaking during transportation. The plastic plug must be removed during the installation process and replaced with the correct vent plug. The vent plug is normally included with the package of fasteners or is fastened to the gear reducer. However, not all gear reducers are equipped with vent plugs.
- d) **Temperature** Temperature alone is not a good way to determine whether a gear reducer is going to fail. Some gear reducers are designed to operate for extended periods at elevated temperature levels that may seem excessive.

Note: Because temperature and noise levels can vary substantially between different brands or types of gear reducers, it is best to consult the gear reducer manufacturer or their owner's manual before performing maintenance on a gear reducer.

I. Troubleshooting guide

Problem	Cause & Solution
Belt lacing pulling out at inside radius	1) Belt tension on inside radius too tight. SOLUTION: Adjust inside radius end roll position. 2) Damaged belt from jam. SOLUTION: Replace belt assembly. 3) Excessively worn belt. SOLUTION: Replace belt assembly.
Grommets pulling out	1) Belt tension inside radius too tight. SOLUTION: Adjust inside radius end roll position. 2) Foreign object rubbing against belt. SOLUTION: Remove foreign object. Repair grommet or replace belt.
Belt drive chain jumping the sprocket teeth	1) Tension too loose. SOLUTION: Adjust belt tension. 2) Worn teeth on sprocket SOLUTION: Replace sprocket.

I. Troubleshooting Guide - continued

Problem	Cause & Solution
Ticking noise near end of conveyor	1.) End roll sprocket out of position. SOLUTION: Adjust position of sprocket 2.) Worn sprocket SOLUTION: Replace sprocket 3.) Worn chain guides. SOLUTION: Replace chain guides.
Problem	Cause & Solution
Loose end roll and end roll shaft.	1.) Loose end roll bearing collars SOLUTION: Adjust end roll position and lock bearing collars. 2.) End roll bearing failure. SOLUTION: Replace end roll bearing. 3.) Broken key in end roll keyway SOLUTION: Replace key, and end roll and end roll shaft as required.
Problem	Cause & Solution
Squealing noise under the conveyor	1.) Frozen return roll bearing SOLUTION: Replace return roll 2.) Foreign object stuck between return roll and belt SOLUTION: Remove foreign object.

J. Preventive maintenance schedule

Component	Service Interval	Maintenance Inspection	
Complete Unit	First 40 hours	Visual check Chain tension Lubricate chain wear guides	
Complete Unit	monthly	Visual check Assure tightness of fasteners; especially the bolts on the side of the frame.	
Conveyor Belt	quarterly	Belt inspection - tension adjustment - general condition and cleanliness Drive chain - Lubricate as indicated in lubrication schedule - Inspect attachment links - Inspect seams	
Drive Motor	quarterly	Drive Motor inspection(visual) - temperature - excessive noise - vibration	

III. Spare parts

A. Recommended spare parts list for Spiral-Lift

Listed below are the Spare Parts we recommend be stocked for 1-5 Flomaster® Spiral-Lifts. By utilizing genuine Flomaster spare parts, you can be assured that these components are proper for your particular unit's continual operation and are backed by the full Flomaster warranty. When ordering please indicate the model and serial number to insure accuracy in parts replacement. Allow 2-3 weeks from receipt of order for shipment. We ship EXW. Cañon City, CO, Net 30 days. NOTE: Model and serial numbers of unit are located on the inside radius frame; stamped into a metal identification plate.

Recommended	Portec	Description
Quantity	Item Number	
1	SP2	Replacement belt w/chain
20	SP4*	SP connecting links
10	SP5*	SP attachment links
10	SP6*	Rivet and washer set
10	SP7*	Nylon bushing
10	SP8*	Grommets
1	SP9	End roll - drive
1	SP10	End roll sprocket
1	SP11	End roll bearing - O.R.
1	SP12	End roll bearing - I.R.
1	SP13	End roll shaft - drive (with extension)
1	SP16	Return roll assembly
1	SP31	Outside perimeter chain wear guide set
1	Tape	Maintenance video tape

* These parts are universal on all sizes

B. Parts list - Flomaster Spiral-Lift

Always supply the following information when ordering or corresponding regarding replacement parts for your Flomaster Spiral-Lift: SERIAL NUMBER and MODEL NUMBER from name plate on unit, and REF. ITEM NUMBER corresponding to your requirement from the Illustrated Parts Diagram. We cannot stress the importance of the Serial Number too strongly since a complete production record is kept on each turn ordered listing the exact components including special purpose items that may be on your specific unit. With the serial number, you are assured of an exact replacement. To procure any parts not listed or shown, please consult PORTEC, Inc., Flomaster Division.

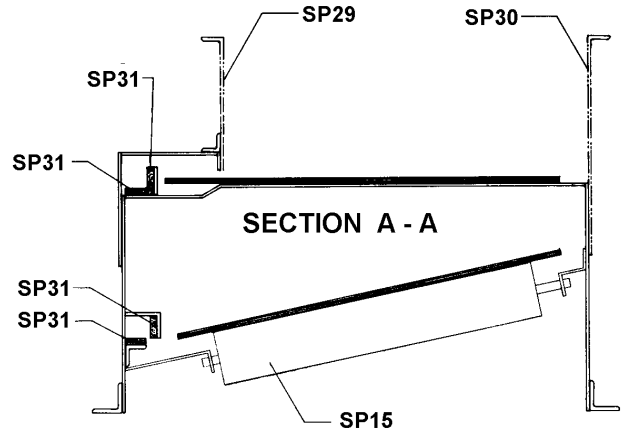
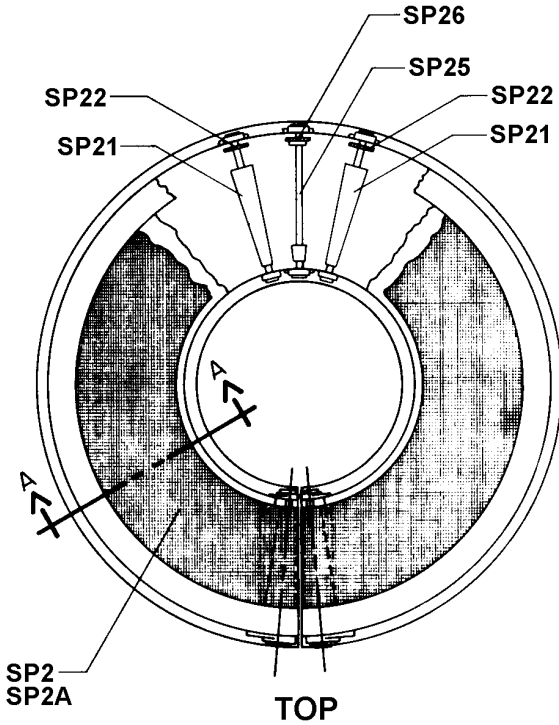
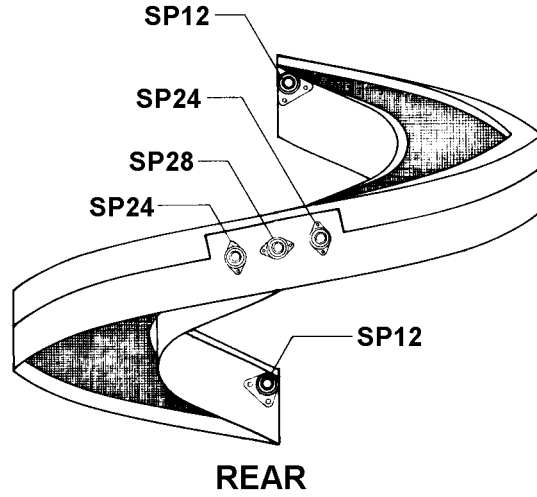
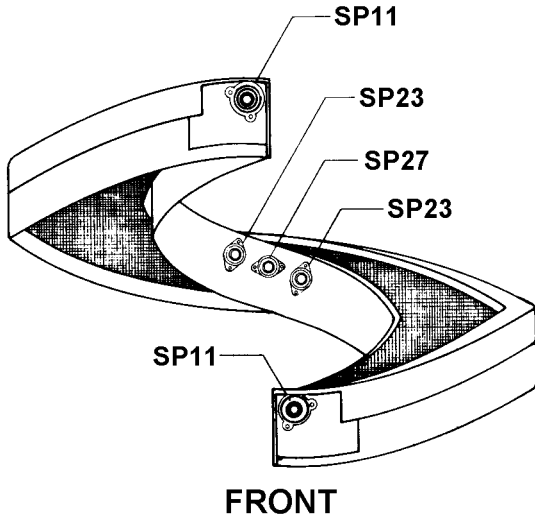
REF ITEM #	PART NAME AND DESCRIPTION	PORTEC PART#
SP2	Curved belt assembly with drive chain - Complete assembly, ready for replacement with lacing installed (pin & master link are included)	
3CT	Chain breaker tool – For breaking chain to replace special attachment link	190129
SP4	Special connecting link - A necessity in assembling turn drive chain. This is not a standard roller chain link, although the appearance is similar. Standard links will not permit proper tracking and may result in chain and belt damage.	020238-#50 std 020235 #50 NP 020214 #60 std
SP5	Special attachment link - Connecting part between chain and belt. To replace broken attachment links, two special connecting links must be used with each attachment link.	020229 #50 std 020230 #50 NP 020315 #60 std
SP6	Rivet and washer set – Attaches chain to belt.	600347 std 600854 S/S
SP7	Nylon bushing - Use with rivet and washer assembly.	080020
SP8	Grommet - Installed in belt (Installation punch and die tools Item# 8CT).	190130 brass 190101 NP
SP9	End roll - Large tapered roll on each end of the conveyor. No bearings or shaft are included.	
SP10	End roll sprocket – Circular chain beveled tooth sprocket.	
SP11	End roll bearing; Outside Radius	
SP12	End roll bearing; Inside Radius	
SP13	End roll shaft; drive end - With drive shaft extension; includes keyways and keys.	
SP14	End roll shaft; non-drive end – Without drive shaft extension; includes keyways and keys	
SP15	Return roll assembly - Includes shaft and	

	roll(s).	
SP15a	Single roll with bearings	
SP15b	Return roll shaft only (hex)	
SP16	* Return roll bearing, I.R. – (tapered rolls only).	
SP17	* Return roll bearing, O.R. – (tapered rolls only).	
SP18	** Bed idler roll – Single with bearings.	
SP20	** Bed idler roll shaft	
SP21	* Snub roll	
SP22	* Snub roll sprocket – with bearing	
SP23	* Snub roll bearing, I.R.	
SP24	* Snub roll bearing, O.R.	
SP25	* Take up roll	
SP26	* Take up roll sprocket	
SP27	* Take up roll bearing, I.R.	
SP28	* Take up roll bearing, O.R.	
SP29	Sideguard; Outside Radius	
SP30	** Sideguard; Inside Radius	
SP31	Outside perimeter chain guides - Complete upper and lower set with installation hardware and instructions.	
	Belt seam lacing - Belt lacing hooks with pin.	
	Belt lacing pin	
	Vise lacing tool - For field installation of belt seam lacing.	110007

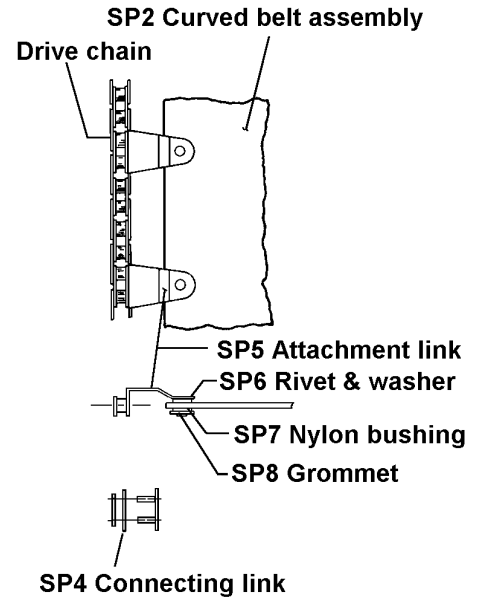
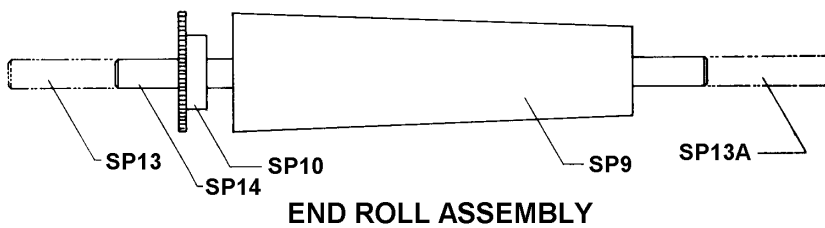
* Not a current Portec design, but available as replacement part

** Optional; not on every conveyor

C. Illustrated parts diagram



SPIRAL-LIFT PARTS LIST





TERMS AND CONDITIONS

VALIDITY – Quotations shall be considered current if outstanding no more than thirty (30) days from date of quotation, unless otherwise stated on quotation.

FREIGHT POLICY – Shipments of products, unless otherwise stated, is EX WORKS PORTEC'S factory. Written claims for damage in shipment should be made against the carrier. Written claims for shortages should be made against the carrier, specifically if there is evidence of shipping carton/container damage and/or if according to the shipping records there is a discrepancy in numbers of containers shipped versus numbers received.

Only in a situation where the container(s) shipped have been received in good condition, checked for physical content, and signed for verification within three days of delivery, and if such shortage has been found, and if PORTEC is notified in writing within 10 days upon receipt of order, PORTEC will establish that there was or was not a shortage. If a shortage is determined, PORTEC will provide the customer with the product/parts at PORTEC'S expense and shall ship F.O.B. as stated in the freight policy. If no shortage is determined, or if others than PORTEC caused the shortage, the claim shall be deemed invalid and it shall be the responsibility of the customer to arrange payment to PORTEC to fill the requirements of the deficiency.

PRICE ACCEPTANCE – The prices quoted herein are based on the quantities specified. Any change in quantities may affect quoted price. All orders are subject to acceptance at PORTEC'S factory. Any expense incurred by PORTEC as a result of cancellation or the making of any change will be included in PORTEC'S invoice unless prior waiver of such expense is obtained from PORTEC.

SHIPMENTS – Quoted Shipment dates are subject to change, without liability for delays beyond PORTEC'S control.

TERMS OF PAYMENT – Invoices are payable net cash 30 days, unless otherwise noted. There will be an interest charge of 1-1/2% per month for all payments received after 35 days. International (**except Canada**) orders are shipped against confirmed irrevocable letters of credit. All payments shall be in U.S. dollars. If the financial responsibility of a purchaser becomes impaired or is unsatisfactory, or if credit is not established, PORTEC reserves the right to request payment in advance or satisfactory guarantee that invoices will be paid promptly when due.

QUALITY ASSURANCE – All of its manufactured products are subject to PORTEC'S Warranty for material and workmanship.

GENERAL – Terms, conditions, and product specifications are subject to change without further obligation to PORTEC.

LIMITED WARRANTY ON NEW EQUIPMENT – PORTEC provides a Limited Warranty that warrants the material and workmanship of its manufactured products, with exceptions noted, for a period for 60 months beginning one month from the date of shipment from PORTEC'S factory, according to recorded serial numbers.

Within the stated warranty period, any material or workmanship showing defects will be repaired or replaced, provided PORTEC is given written notice within 30 days after failure, and a willingness is expressed to submit the product to PORTEC, and

if PORTEC authorizes the return of the product, and the product is returned. This warranty does not cover against normal wear of parts or materials. Warranty parts are supplied via EX WORKS PORTEC'S factory and unless PORTEC makes express agreement, the purchaser shall bear the expense of installation. PORTEC reserves the right at any time to supervise or install any part of replacement, or supervise adjustment incident to satisfactory operation of equipment. *A possible Warranty PO for parts and/or service may be required prior to shipping parts or exercising warranty labor.*

ITEMS IDENTIFIED AS COMPONENT AND REPLACEMENT PARTS – PORTEC parts will be warranted for a period of one (1) year from the date of shipment from the PORTEC Factory. This warranty on parts will cover only defects in workmanship or material. *The warranty does not cover the costs of the installation of such parts unless authorized by the designated PORTEC representative.*

Unauthorized returns, modifications, additions or variations, from procedures and information contained in PORTEC'S Owner's Manuals, and Product Data bulletins, or any misuse, negligence, accident, product jam, or loading beyond rated capacity invalidates this warranty.

EXCEPTIONS:

1. Because of varying operating conditions, all belting supplied will necessarily be subject to manufacturers', warranty rather than that of PORTEC.

2. Some OEM equipment including motors and gear reducers will be subject to the manufacturer's warranty, not PORTEC'S. PORTEC Customer & Product Support will provide assistance in contacting the proper manufacturer's representative. If a replacement is provided from PORTEC stock, a Possible Warranty PO must be provided. If the warranty is deemed invalid and PORTEC is not reimbursed for the warranty claim, the PO will be exercised.

3. PORTEC further reserves the right to void its warranty where final destination and specific application are withheld; product is improperly installed or maintained by others; product is modified without the consent from the designated PORTEC service representative; product is improperly protected against hazards and adverse environmental conditions during storage prior to or during installation; and/or product is used for applications/conditions other than indicated upon placement of order.

The foregoing warranty is exclusive and in lieu of all other warranties whether written, oral, or implied (including any warranty of merchantability or fitness for any purpose). Under no circumstances shall PORTEC be liable for incidental or consequential damages. The foregoing warranty cannot be changed except by written authorization signed by an authorized PORTEC representative, and no attempt to repair or promise to repair or improve PORTEC products by any other representative of PORTEC shall change or extend said warranty in any manner whatsoever.

